

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 June 2002 (13.06.2002)

PCT

(10) International Publication Number
WO 02/046227 A3

(51) International Patent Classification⁷: **C07K 14/605**,
14/765, C12N 15/62, A61K 38/38, 38/26, C07K 19/00,
A61P 3/10

(21) International Application Number: PCT/US01/43165

(22) International Filing Date:
29 November 2001 (29.11.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/251,954 7 December 2000 (07.12.2000) US

(71) Applicant (for all designated States except US): **ELI LILLY AND COMPANY** [US/US]; Lilly Corporate Center, Indianapolis, IN 46285 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GLAESNER, Wolfgang** [DE/US]; 7512 Fieldstone Court, Indianapolis, IN 46254 (US). **MICANOVIC, Radmilla** [US/US]; 7126 White Oak Trail, Indianapolis, IN 46236 (US). **TSCHANG, Sheng-Hung, Rainbow** [US/US]; 4963 Riley Mews, Carmel, IN 46033 (US).

(74) Agents: **STEWART, Mark, J.** et al.; Eli Lilly and Company, Lilly Corporate Center, Drop Code 1104, Indianapolis, IN 46285 (US).

(81) Designated States (national): AE, AG, AL, AM, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK (utility model), SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AI, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Published:

— with international search report

(88) Date of publication of the international search report:
24 April 2003

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: GLP-1 FUSION PROTEINS

(57) Abstract: The present invention relates to glucagon-like-1 compounds fused to proteins that have the effect of extending the in vivo half-life of the peptides. These fusion proteins can be used to treat non-insulin dependent diabetes mellitus as well as a variety of other conditions.

WO 02/046227 A3

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US 01/43165

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07K14/605 C07K14/765 C12N15/62 A61K38/38 A61K38/26
C07K19/00 A61P3/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07K C12N A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, MEDLINE, CHEM ABS Data, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 00 69911 A (ARCHEVEQUE BENOIT L ; CONJUCHEM INC (CA); LEBLANC ANOUK (CA); HOLME) 23 November 2000 (2000-11-23) claims the whole document	1-50
A	KNUDSEN LOTTE B ET AL: "Potent derivatives of glucagon-like peptide-1 with pharmacokinetic properties suitable for once daily administration." JOURNAL OF MEDICINAL CHEMISTRY, vol. 43, no. 9, 4 May 2000 (2000-05-04), pages 1664-1669, XP002222050 ISSN: 0022-2623 the whole document	1-50

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

22 November 2002

Date of mailing of the international search report

21/01/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Döpfer, K-P

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/43165

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0069911 A	23-11-2000	AT 226593 T	15-11-2002
		AU 4774800 A	05-12-2000
		AU 4855500 A	05-12-2000
		AU 5027100 A	05-12-2000
		AU 5139300 A	05-12-2000
		BR 0010750 A	26-02-2002
		BR 0010757 A	19-02-2002
		CN 1350548 T	22-05-2002
		CN 1351611 T	29-05-2002
		EP 1171582 A2	16-01-2002
		EP 1180121 A1	20-02-2002
		EP 1179012 A1	13-02-2002
		EP 1105409 A2	13-06-2001
		WO 0070665 A2	23-11-2000
		NO 20015584 A	03-01-2002
		WO 0069911 A1	23-11-2000
		WO 0069900 A2	23-11-2000
		WO 0069902 A1	23-11-2000
		US 6329336 B1	11-12-2001
		US 2002049153 A1	25-04-2002

THIS PAGE BLANK (USPTO)